

Abstract

The invention is directed to compositions and methods for forming highly transparent and electrically conductive coatings/films by exploiting self patterning nanostructures composed of electrically conductive materials. The resulting layer is suitable for conducting electricity in applications where a transparent electrode is required. Typical applications include, but are not limited to; LC displays, touch screens, EMI shielding windows, and architectural windows. In one embodiment, carbon nanotubes are applied to an insulating substrate to form an electrically conductive network of nanotubes with controlled porosity in the network. The open area, between the networks of nanotubes, increases the optical transparency in the visible spectrum while the continuous nanotube phase provides electrical conductivity across the entire surface or patterned area. Through the controlled application of this self assembled network of nanotubes of by means of printing or spraying, patterned areas can be formed to function as electrodes in devices. The use of printing technology to form these electrodes obviates the need for more expensive process such as vacuum deposition and photolithography typically employed today during the formation of ITO coatings.